

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number  
**WO 2004/036204 A3**

(51) International Patent Classification<sup>7</sup>: **G01N 27/447**

(21) International Application Number:  
PCT/DK2003/000690

(22) International Filing Date: 13 October 2003 (13.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
PA 2002 01565 13 October 2002 (13.10.2002) DK

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(81) Designated States (*national*): AE, AG, AL, AM, AT (uti-  
lity model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,  
CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (uti-  
lity model), DE, DK (utility model), DK, DM, DZ, EC, EE  
(utility model), EE, ES, FI (utility model), FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,  
MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO,  
SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

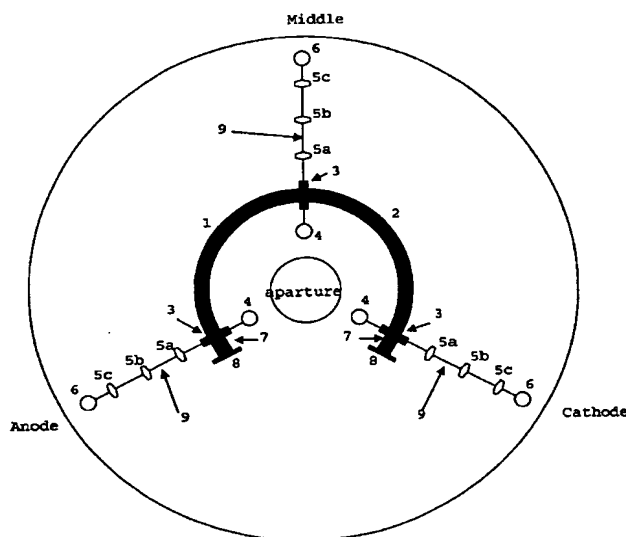
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

[Continued on next page]

(54) Title: A TWO-DIMENSIONAL MICROFLUID BIOMOLECULE SEPARATION SYSTEM



(57) Abstract: The invention relates to a micro fluid biomolecule separation system comprising a primary separating path and one or more secondary process paths. The primary separating path being in the form of a separating coating carried on a substrate, wherein the separating coating comprises one or more separating layers, and at least one separating layer consists of or comprises one or more pH active components. The fluid biomolecule separation system comprises means for applying a voltage over the primary separating path. The secondary process path(s) comprises one or more inlets in liquid communication with the primary separating path. The one or more inlets is placed along or extends along the primary separating path, whereby biomolecules separated along the primary path is capable of being introduced into the secondary process path(s) for being processed further.

WO 2004/056204 A3



(88) Date of publication of the international search report:  
3 June 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 03/00690

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N27/447

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N B01J B01D B01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 162 454 A (KARUBE ISAO) 12 December 2001 (2001-12-12) paragraph [0026] ---	1-27
Y	EP 1 044 716 A (CAHILL MICHAEL DR ;NORDHEIM ALFRED PROF DR (DE); DRUKIER ANDRZEY D) 18 October 2000 (2000-10-18) paragraph [0020] - paragraph [0027] ---	1-27
A	US 6 030 581 A (VIRTANEN JORMA) 29 February 2000 (2000-02-29) column 12, line 10 - line 27 ---	1-27
A	US 2001/055812 A1 (KIEFFER-HIGGINS STEPHEN G ET AL) 27 December 2001 (2001-12-27) paragraph [0319] - paragraph [0321]; figures 28,29 -----	1-27

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

15 March 2004

Date of mailing of the international search report

01.04.2004

Name and mailing address of the ISA  
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# INTERNATIONAL SEARCH REPORT

International Application No. PCT/DK 03/00690

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-3,10-13

claims 1-3, 10-13 directed to the pH active components and their layout.

2. Claims: 4-9,14

directed to physical parameters of the primary path.

3. Claims: 15-17

directed to the substance of the secondary path.

4. Claims: 18-27

directed to the structure of the scondary paths.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/DK 03/00690

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1162454	A	12-12-2001	JP 2000249684 A AU 2825400 A CA 2363553 A1 EP 1162454 A1 WO 0052458 A1	14-09-2000 21-09-2000 08-09-2000 12-12-2001 08-09-2000
EP 1044716	A	18-10-2000	EP 1044716 A1	18-10-2000
US 6030581	A	29-02-2000	US 2001048895 A1 AU 740195 B2 AU 6346498 A BG 63763 B1 BG 103765 A BR 9808653 A CA 2282307 A1 EA 2403 B1 EE 9900377 A EP 0968434 A2 GB 2337113 A ,B HK 1023400 A1 IL 131619 A JP 3356784 B2 JP 2000515632 T LV 12469 A LV 12469 B NO 994133 A NZ 338017 A SI 20346 A SK 118099 A3 CN 1249816 T HU 0003152 A2 ID 22965 A LT 99119 A ,B PL 335482 A1 TR 9902440 T2 WO 9838510 A2	06-12-2001 01-11-2001 18-09-1998 29-11-2002 30-06-2000 31-07-2001 03-09-1998 25-04-2002 17-04-2000 05-01-2000 10-11-1999 07-12-2001 01-12-2002 16-12-2002 21-11-2000 20-04-2000 20-09-2000 28-10-1999 30-03-2001 28-02-2001 16-05-2000 05-04-2000 29-01-2001 23-12-1999 25-04-2000 25-04-2000 21-02-2000 03-09-1998
US 2001055812	A1	27-12-2001	AU 4144897 A CA 2263324 A1 EP 0917648 A1 JP 2001503854 T WO 9807019 A1 US 6319469 B1 AU 702403 B2 AU 1283397 A CA 2239613 A1 CN 1208464 A EP 0865606 A1 JP 2002503331 T NO 982563 A WO 9721090 A1 US 2002137218 A1 US 2002150512 A1 US 6143248 A	06-03-1998 19-02-1998 26-05-1999 21-03-2001 19-02-1998 20-11-2001 18-02-1999 27-06-1997 12-06-1997 17-02-1999 23-09-1998 29-01-2002 05-08-1998 12-06-1997 26-09-2002 17-10-2002 07-11-2000

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/DK 03/00690

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.